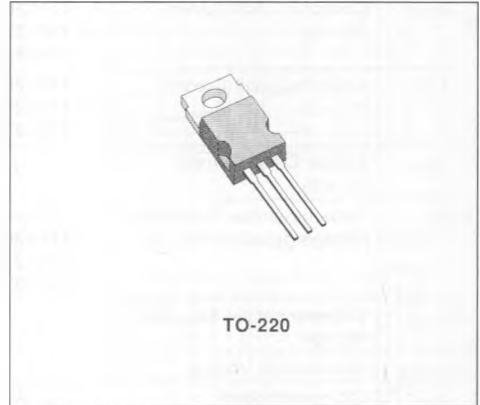


POWER DARLINGTONS

DESCRIPTION

The TIP120, TIP121 and TIP122 are silicon epitaxial-base NPN transistors in monolithic Darlington configuration in Jedec TO-220 plastic package, intended for use in power linear and switching applications. The complementary PNP types are the TIP125, TIP126 and TIP127 respectively.



INTERNAL SCHEMATIC DIAGRAMS



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	NPN PNP*	Value			Unit
			TIP120 TIP125	TIP121 TIP126	TIP122 TIP127	
V_{CBO}	Collector-base Voltage ($I_E = 0$)		60	80	100	V
V_{CEO}	Collector-emitter Voltage ($I_B = 0$)		60	80	100	V
V_{EBO}	Emitter-base Voltage ($I_C = 0$)		5			V
I_C	Collector Current		5			A
I_{CM}	Collector Peak Current		8			A
I_B	Base Current		0.1			A
P_{101}	Total Power Dissipation at $T_{case} \leq 25^\circ\text{C}$ $T_{amb} \leq 25^\circ\text{C}$		65			W
T_{stg}	Storage Temperature		- 65 to 150			$^\circ\text{C}$
T_j	Junction Temperature		150			$^\circ\text{C}$

* For PNP types voltage and current values are negative

THERMAL DATA

$R_{th(j)case}$	Thermal Resistance Junction-case	Max	1.92	$^{\circ}C/W$
$R_{th(j)amb}$	Thermal Resistance Junction-ambient	Max	62.5	$^{\circ}C/W$

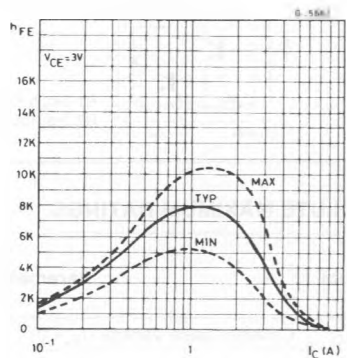
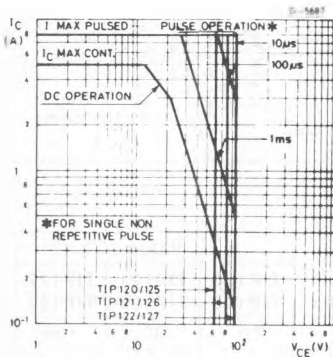
ELECTRICAL CHARACTERISTICS ($T_{case} = 25^{\circ}C$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CEO}	Collector Cutoff Current ($I_B = 0$)	for TIP120/5 $V_{CE} = 30V$ for TIP121/6 $V_{CE} = 40V$ for TIP122/7 $V_{CE} = 50V$			0.5 0.5 0.5	mA mA mA
I_{CBO}	Collector Cutoff Current ($I_E = 0$)	for TIP120/5 $V_{CB} = 60V$ for TIP121/6 $V_{CB} = 80V$ for TIP122/7 $V_{CB} = 100V$			0.2 0.2 0.2	mA mA mA
I_{EBO}	Emitter Cutoff Current ($I_C = 0$)	$V_{EB} = 5V$			2	mA
$V_{CE(sus)}^*$	Collector-emitter Sustaining Voltage ($I_B = 0$)	$I_C = 30mA$ for TIP120/5 for TIP121/6 for TIP122/7	60 80 100			V V V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 3A$ $I_B = 12mA$ $I_C = 5A$ $I_B = 20mA$			2 4	V V
$V_{BE(on)}^*$	Base-emitter Voltage	$I_C = 3A$ $V_{CE} = 3V$			2.5	V
h_{FE}^*	DC current Gain	$I_C = 0.5A$ $V_{CE} = 3V$ $I_C = 3A$ $V_{CE} = 3V$	1000 1000			

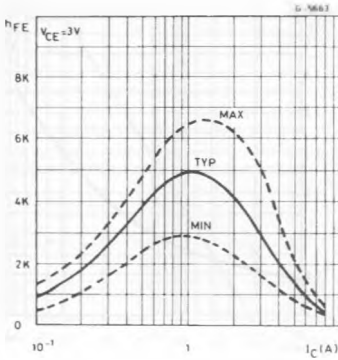
* Pulsed : pulse duration = 300 μs , duty cycle < 2 %.

Safe Operating Areas.

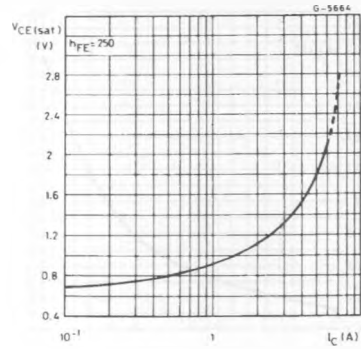
DC Current Gain (NPN types).



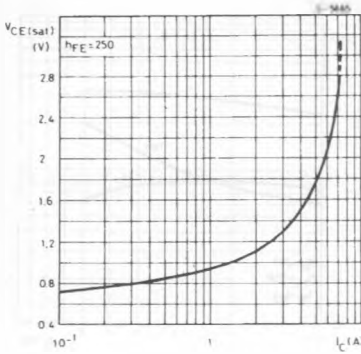
DC Current Gain (PNP types).



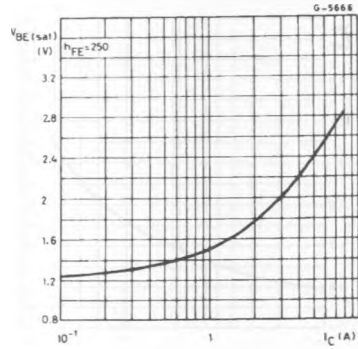
Collector-emitter Saturation Voltage (NPN types).



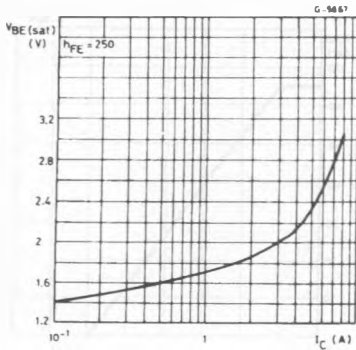
Collector-emitter Saturation Voltage (NPN types).



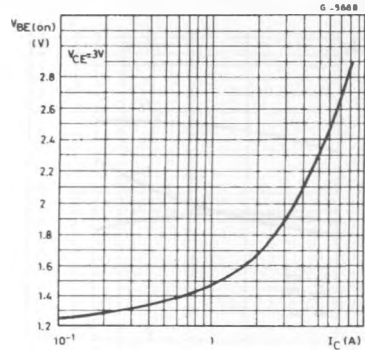
Base-emitter Saturation Voltage (NPN types).



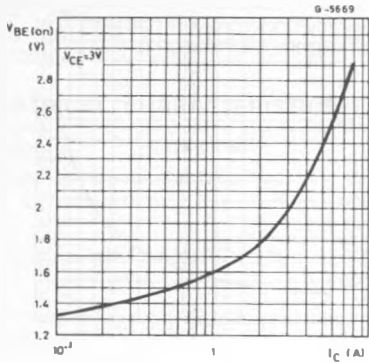
Base-emitter Saturation Voltage (PNP types).



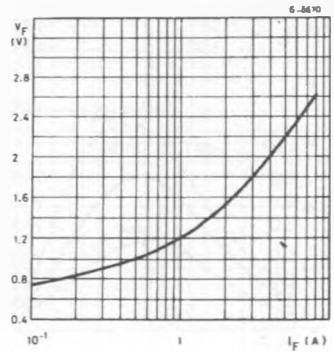
Base-emitter Voltage (NPN types).



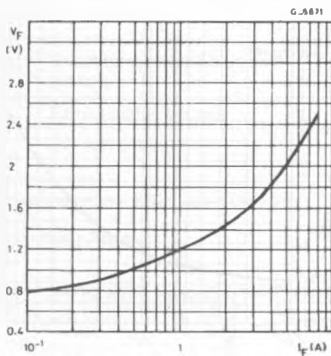
Base-emitter Voltage (PNP types).



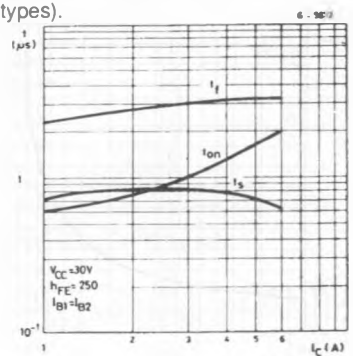
Freewheel Diode Forward Voltage (NPN types).



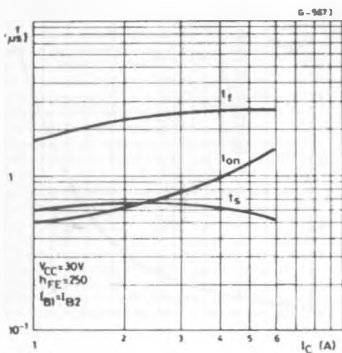
Freewheel Diode Forward Voltage (PNP types).



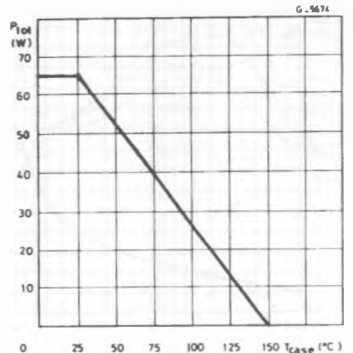
Switching Times vs. T_{case} Resistive Load (NPN types).



Switching Times vs. T_{case} Resistive Load (PNP types).



Derating Curve.



Free-air Temperature Derating Curve.

